



SEQUENCE LISTING

<110> DRUILHE, PIERRE
DAUBERSIES, PIERRE

<120> MALARIAL PRE-ERYTHROCYTIC STAGE POLYPEPTIDE MOLECULES

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<141> 2000-12-22

<150> US 08/973,462

<151> 1998-02-06

<150> PCT/FR96/00894

<151> 1996-06-12

<150> FR 95/07007

<151> 1995-06-13

<160> 29

<170> PatentIn version 3.3

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cca agt gtt gaa gaa agt gta gaa gaa aat gtt gaa gaa agt gta gct Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser Val Ala 755 760 765	2304
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gaa aat gtt gaa gaa agt gta gct cca act gtt gaa gaa att gta gct Glu Asn Val Glu Glu Ser Val Ala Pro Thr Val Glu Glu Ile Val Ala 785 790 795 800	2400
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ggg ggt atc gaa act gag gaa ata aag gac agt ata tta aat gag ata Gly Gly Ile Glu Thr Glu Glu Ile Lys Asp Ser Ile Leu Asn Glu Ile	2544

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Leu Lys Glu Leu Glu Lys Ala Leu Ser Glu Asp Ser Lys Glu Ile	
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Leu Glu Glu Val His Glu Leu Lys Glu Glu Val Glu His Ile Ile	
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Ile Lys Lys Cys His Met Arg Glu Lys Ile Asn Lys Tyr Phe Phe Leu
35 40 45

Ile Lys Ile Leu Thr Cys Thr Ile Leu Ile Trp Ala Val Gln Tyr Asp
50 55 60

Asn Asn Ser Asp Ile Asn Lys Ser Trp Lys Lys Asn Thr Tyr Val Asp
65 70 75 80

Lys Lys Leu Asn Lys Leu Phe Asn Arg Ser Leu Gly Glu Ser Gln Val
85 90 95

Asn Gly Glu Leu Ala Ser Glu Glu Val Lys Glu Lys Ile Leu Asp Leu
100 105 110

Leu Glu Glu Gly Asn Thr Leu Thr Glu Ser Val Asp Asp Asn Lys Asn
115 120 125

Leu Glu Glu Ala Glu Asp Ile Lys Glu Asn Ile Leu Leu Ser Asn Ile
130 135 140

Glu Glu Pro Lys Glu Asn Ile Ile Asp Asn Leu Leu Asn Asn Ile Gly
145 150 155 160

Gln Asn Ser Glu Lys Gln Glu Ser Val Ser Glu Asn Val Gln Val Ser
165 170 175

Asp Glu Leu Phe Asn Glu Leu Leu Asn Ser Val Asp Val Asn Gly Glu
180 185 190

Val Lys Glu Asn Ile Leu Glu Glu Ser Gln Val Asn Asp Asp Ile Phe
 195 200 205

Asn Ser Leu Val Lys Ser Val Gln Gln Glu Gln Gln His Asn Val Glu
 210 215 220

Glu Lys Val Glu Glu Ser Val Glu Glu Asn Asp Glu Glu Ser Val Glu
 225 230 235 240

Glu Asn Val Glu Glu Asn Val Glu Glu Asn Asp Asp Gly Ser Val Ala
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Ser Ser Ile Glu Glu Asn Val Ala Pro Thr Val Glu Glu Ile Val Ala
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Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala
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Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile Val Ala
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725 730 735

Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Ser Val Ala
740 745 750

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Pro Ser Val Glu Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala

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Glu	Glu	Asp	Ile	Leu	Lys	Glu	Val	Lys	Glu	Ile	Lys	Glu	Leu	Glu
1325						1330					1335			
Ser	Glu	Ile	Leu	Glu	Asp	Tyr	Lys	Glu	Leu	Lys	Thr	Ile	Glu	Thr
1340						1345					1350			
Asp	Ile	Leu	Glu	Glu	Lys	Lys	Glu	Ile	Glu	Lys	Asp	His	Phe	Glu
1355						1360					1365			
Lys	Phe	Glu	Glu	Glu	Ala	Glu	Glu	Ile	Lys	Asp	Leu	Glu	Ala	Asp
1370						1375					1380			
Ile	Leu	Lys	Glu	Val	Ser	Ser	Leu	Glu	Val	Glu	Glu	Glu	Lys	Lys
1385						1390					1395			

Leu	Glu	Glu	Val	His	Glu	Leu	Lys	Glu	Glu	Val	Glu	His	Ile	Ile
1400						1405					1410			
Ser	Gly	Asp	Ala	His	Ile	Lys	Gly	Leu	Glu	Glu	Asp	Asp	Leu	Glu
1415						1420					1425			
Glu	Val	Asp	Asp	Leu	Lys	Gly	Ser	Ile	Leu	Asp	Met	Leu	Lys	Gly
1430						1435					1440			
Asp	Met	Glu	Leu	Gly	Asp	Met	Asp	Lys	Glu	Ser	Leu	Glu	Asp	Val
1445						1450					1455			
Thr	Thr	Lys	Leu	Gly	Glu	Arg	Val	Glu	Ser	Leu	Lys	Asp	Val	Leu
1460						1465					1470			
Ser	Ser	Ala	Leu	Gly	Met	Asp	Glu	Glu	Gln	Met	Lys	Thr	Arg	Lys
1475						1480					1485			
Lys	Ala	Gln	Arg	Pro	Lys	Leu	Glu	Glu	Val	Leu	Leu	Lys	Glu	Glu
1490						1495					1500			
Val	Lys	Glu	Glu	Pro	Lys	Lys	Lys	Ile	Thr	Lys	Lys	Lys	Val	Arg
1505						1510					1515			
Phe	Asp	Ile	Lys	Asp	Lys	Glu	Pro	Lys	Asp	Glu	Ile	Val	Glu	Val
1520						1525					1530			
Glu	Met	Lys	Asp	Glu	Asp	Ile	Glu	Glu	Asp	Val	Glu	Glu	Asp	Ile
1535						1540					1545			
Glu	Glu	Asp	Ile	Glu	Glu	Asp	Lys	Val	Glu	Asp	Ile	Asp	Glu	Asp
1550						1555					1560			
Ile	Asp	Glu	Asp	Ile	Gly	Glu	Asp	Lys	Asp	Glu	Val	Ile	Asp	Leu
1565						1570					1575			
Ile	Val	Gln	Lys	Glu	Lys	Arg	Ile	Glu	Lys	Val	Lys	Ala	Lys	Lys

1580		1585		1590
Lys Lys Leu Glu Lys Lys Val Glu Glu Gly Val Ser Gly Leu Lys	1595	1600		1605
Lys His Val Asp Glu Val Met Lys Tyr Val Gln Lys Ile Asp Lys	1610	1615		1620
Glu Val Asp Lys Glu Val Ser Lys Ala Leu Glu Ser Lys Asn Asp	1625	1630		1635
Val Thr Asn Val Leu Lys Gln Asn Gln Asp Phe Phe Ser Lys Val	1640	1645		1650
Lys Asn Phe Val Lys Lys Tyr Lys Val Phe Ala Ala Pro Phe Ile	1655	1660		1665
Ser Ala Val Ala Ala Phe Ala Ser Tyr Val Val Gly Phe Phe Thr	1670	1675		1680
Phe Ser Leu Phe Ser Ser Cys Val Thr Ile Ala Ser Ser Thr Tyr	1685	1690		1695
Leu Leu Ser Lys Val Asp Lys Thr Ile Asn Lys Asn Lys Glu Arg	1700	1705		1710
Pro Phe Tyr Ser Phe Val Phe Asp Ile Phe Lys Asn Leu Lys His	1715	1720		1725
Tyr Leu Gln Gln Met Lys Glu Lys Phe Ser Lys Glu Lys Asn Asn	1730	1735		1740
Asn Val Ile Glu Val Thr Asn Lys Ala Glu Lys Lys Gly Asn Val	1745	1750		1755
Gln Val Thr Asn Lys Thr Glu Lys Thr Thr Lys Val Asp Lys Asn	1760	1765		1770

Asn Lys Val Pro Lys Lys Arg Arg Thr Gln Lys Ser Lys
 1775 1780 1785

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 gat ata aag gaa aat atc tta tta agt aat ata gaa gaa cca aaa gaa 97
 Asp Ile Lys Glu Asn Ile Leu Leu Ser Asn Ile Glu Glu Pro Lys Glu
 20 25 30
 aat att att gac aat tta tta aat aat att gga caa aat tca gaa aaa 145
 Asn Ile Ile Asp Asn Leu Leu Asn Asn Ile Gly Gln Asn Ser Glu Lys
 35 40 45
 caa gaa agt gta tca gaa aat gta caa gtc agt gat gaa ctt ttt aat 193
 Gln Glu Ser Val Ser Glu Asn Val Gln Val Ser Asp Glu Leu Phe Asn
 50 55 60
 gaa tta tta aat agt gta gat gtt aat gga gaa gta aaa gaa aat att 241
 Glu Leu Leu Asn Ser Val Asp Val Asn Gly Glu Val Lys Glu Asn Ile
 65 70 75 80
 ttg gag gaa agt caa gtt aat gac gat att ttt aat agt tta gta aaa 289
 Leu Glu Glu Ser Gln Val Asn Asp Asp Ile Phe Asn Ser Leu Val Lys
 85 90 95
 agt gtt caa caa gaa caa caa cac aat gtt gaa gaa aaa gtt gaa gaa 337
 Ser Val Gln Gln Glu Gln Gln His Asn Val Glu Glu Lys Val Glu Glu
 100 105 110
 agt gta gaa gaa aat gac gaa gaa agt gta gaa gaa aat gta gaa gaa 385
 Ser Val Glu Glu Asn Asp Glu Glu Ser Val Glu Glu Asn Val Glu Glu
 115 120 125
 aat gta gaa gaa aat gac gac gga agt gta gcc tca agt gtt gaa gaa 433
 Asn Val Glu Glu Asn Asp Asp Gly Ser Val Ala Ser Ser Val Glu Glu
 130 135 140

agt	ata	gct	tca	agt	gtt	gat	gaa	agt	ata	gat	tca	agt	att	gaa	gaa	481
Ser	Ile	Ala	Ser	Ser	Val	Asp	Glu	Ser	Ile	Asp	Ser	Ser	Ile	Glu	Glu	
145					150					155					160	
aat	gta	gct	cca	act	gtt	gaa	gaa	atc	gta	gct	cca	act	gtt	gaa	gaa	529
Asn	Val	Ala	Pro	Thr	Val	Glu	Glu	Ile	Val	Ala	Pro	Thr	Val	Glu	Glu	
				165					170					175		
att	gta	gct	cca	agt	gtt	gta	gaa	agt	gtg	gct	cca	agt	gtt	gaa	gaa	577
Ile	Val	Ala	Pro	Ser	Val	Val	Glu	Ser	Val	Ala	Pro	Ser	Val	Glu	Glu	
			180					185					190			
agt	gta	gct	cca	agt	gtt	gaa	gaa	agt	gta	gct	gaa	aat	gtt	gaa	gaa	625
Ser	Val	Ala	Pro	Ser	Val	Glu	Glu	Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	
		195					200					205				
agt	gta	gct	gaa	aat	gtt	gaa	gaa	atc	gta	gct	cca	agt	gtt	gaa	gaa	673
Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	Ile	Val	Ala	Pro	Ser	Val	Glu	Glu	
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agt	gta	gct	gaa	aat	gtt	gaa	gaa	agt	gta	gct	gaa	aat	gtt	gaa	gaa	721
Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	
225					230					235					240	
agt	gta	gct	gaa	aat	gtt	gaa	gaa	agt	gta	gct	gaa	aat	gtt	gaa	gaa	769
Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	
				245					250					255		
agt	gta	gct	gaa	aat	gtt	gaa	gaa	atc	gta	gct	cca	act	gtt	gaa	gaa	817
Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	Ile	Val	Ala	Pro	Thr	Val	Glu	Glu	
			260					265					270			
agt	gta	gct	cca	act	gtt	gaa	gaa	att	gta	gct	cca	act	gtt	gaa	gaa	865
Ser	Val	Ala	Pro	Thr	Val	Glu	Glu	Ile	Val	Ala	Pro	Thr	Val	Glu	Glu	
		275					280					285				
agt	gta	gct	cca	act	gtt	gaa	gaa	att	gta	gtt	cca	agt	gtt	gaa	gaa	913
Ser	Val	Ala	Pro	Thr	Val	Glu	Glu	Ile	Val	Val	Pro	Ser	Val	Glu	Glu	
	290					295					300					
agt	gta	gct	cca	agt	gtt	gaa	gaa	agt	gta	gct	gaa	aat	gtt	gaa	gaa	961
Ser	Val	Ala	Pro	Ser	Val	Glu	Glu	Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	
305					310					315					320	
agt	gta	gct	gaa	aat	gtt	gaa	gaa	agt	gta	gct	gaa	aat	gtt	gaa	gaa	1009
Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	
				325					330					335		
agt	gta	gct	gaa	aat	gtt	gaa	gaa	agt	gta	gct	gaa	aat	gtt	gaa	gaa	1057
Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	Ser	Val	Ala	Glu	Asn	Val	Glu	Glu	
			340					345					350			

atc gta gct cca agt gtt gaa gaa atc gta gct cca act gtt gaa gaa Ile Val Ala Pro Ser Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu 355 360 365	1105
agt gtt gct gaa aac gtt gca aca aat tta tca gac aat ctt tta agt Ser Val Ala Glu Asn Val Ala Thr Asn Leu Ser Asp Asn Leu Leu Ser 370 375 380	1153
aat tta tta ggt ggt atc gaa act gag gaa ata aag gac agt ata tta Asn Leu Leu Gly Gly Ile Glu Thr Glu Glu Ile Lys Asp Ser Ile Leu 385 390 395 400	1201
aat gag ata gaa gaa gta aaa gaa aat gta gtc acc aca ata cta gaa Asn Glu Ile Glu Glu Val Lys Glu Asn Val Val Thr Thr Ile Leu Glu 405 410 415	1249
aaa gta gaa gaa act aca gct gaa agt gta act act ttt agt aat ata Lys Val Glu Glu Thr Thr Ala Glu Ser Val Thr Thr Phe Ser Asn Ile 420 425 430	1297
tta gag gag ata caa gaa aat act att act aat gat act ata gag gaa Leu Glu Glu Ile Gln Glu Asn Thr Ile Thr Asn Asp Thr Ile Glu Glu 435 440 445	1345
aaa tta gaa gaa ctc cac gaa aat gta tta agt gcc gct tta gaa aat Lys Leu Glu Glu Leu His Glu Asn Val Leu Ser Ala Ala Leu Glu Asn 450 455 460	1393
acc caa agt gaa gag gaa aag aaa gaa gta ata gat gta att gaa gaa Thr Gln Ser Glu Glu Glu Lys Lys Glu Val Ile Asp Val Ile Glu Glu 465 470 475 480	1441
gta aaa gaa gag gtc gct acc act tta ata gaa act gtg gaa cag gca Val Lys Glu Glu Val Ala Thr Thr Leu Ile Glu Thr Val Glu Gln Ala 485 490 495	1489
gaa gaa gag agc gaa agt aca att acg gaa ata ttt gaa aat tta gaa Glu Glu Glu Ser Glu Ser Thr Ile Thr Glu Ile Phe Glu Asn Leu Glu 500 505 510	1537
gaa aat gca gta gaa agt aat gaa aaa gtt gca gag aat tta gag aaa Glu Asn Ala Val Glu Ser Asn Glu Lys Val Ala Glu Asn Leu Glu Lys 515 520 525	1585
tta aac gaa act gta ttt aat act gta tta gat aaa gta gag gaa aca Leu Asn Glu Thr Val Phe Asn Thr Val Leu Asp Lys Val Glu Glu Thr 530 535 540	1633
gta gaa att agc gga gaa agt tta gaa aac aat gaa atg gat aaa gca Val Glu Ile Ser Gly Glu Ser Leu Glu Asn Asn Glu Met Asp Lys Ala	1681

545		550		555		560	
ttt ttt agt gaa ata ttt gat aat gta aaa gga ata caa gaa aat tta		ttt gat aat gta aaa gga ata caa gaa aat tta	1729				
Phe Phe Ser Glu Ile Phe Asp Asn Val Lys Gly Ile Gln Glu Asn Leu		Phe Asp Asn Val Lys Gly Ile Gln Glu Asn Leu					
	565		570				
tta aca ggt atg ttt cga agt ata gaa acc agt ata gta atc caa tca		ttt cga agt ata gaa acc agt ata gta atc caa tca	1777				
Leu Thr Gly Met Phe Arg Ser Ile Glu Thr Ser Ile Val Ile Gln Ser		Phe Arg Ser Ile Glu Thr Ser Ile Val Ile Gln Ser					
	580		585				
gaa gaa aag gtt gat ttg aat gaa aat gtg gtt agt tcg att tta gat		ttg aat gaa aat gtg gtt agt tcg att tta gat	1825				
Glu Glu Lys Val Asp Leu Asn Glu Asn Val Val Ser Ser Ile Leu Asp		Glu Asn Val Val Ser Ser Ile Leu Asp					
	595		600				
aat ata gaa aat atg aaa gaa ggt tta tta aat aaa tta gaa aat att		gaa ggt tta tta aat aaa tta gaa aat att	1873				
Asn Ile Glu Asn Met Lys Glu Gly Leu Leu Asn Lys Leu Glu Asn Ile		Glu Gly Leu Leu Asn Lys Leu Glu Asn Ile					
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tca agt act gaa ggc gaa			1891				
Ser Ser Thr Glu Gly Glu							
625		630					

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20	25
	30

Asn Ile Ile Asp Asn Leu Leu Asn Asn Ile Gly Gln Asn Ser Glu Lys	
35	40
	45

Gln Glu Ser Val Ser Glu Asn Val Gln Val Ser Asp Glu Leu Phe Asn	
50	55
	60

Glu Leu Leu Asn Ser Val Asp Val Asn Gly Glu Val Lys Glu Asn Ile	
65	70
	75
	80

Leu Glu Glu Ser Gln Val Asn Asp Asp Ile Phe Asn Ser Leu Val Lys

85

90

95

Ser Val Gln Gln Glu Gln Gln His Asn Val Glu Glu Lys Val Glu Glu
 100 105 110

Ser Val Glu Glu Asn Asp Glu Glu Ser Val Glu Glu Asn Val Glu Glu
 115 120 125

Asn Val Glu Glu Asn Asp Asp Gly Ser Val Ala Ser Ser Val Glu Glu
 130 135 140

Ser Ile Ala Ser Ser Val Asp Glu Ser Ile Asp Ser Ser Ile Glu Glu
 145 150 155 160

Asn Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu
 165 170 175

Ile Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu
 180 185 190

Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
 195 200 205

Ser Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Ser Val Glu Glu
 210 215 220

Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
 225 230 235 240

Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
 245 250 255

Ser Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu
 260 265 270

Ser Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu
 275 280 285

Ser Val Ala Pro Thr Val Glu Glu Ile Val Val Pro Ser Val Glu Glu
 290 295 300

Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
 305 310 315 320

Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
 325 330 335

Ser Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu
 340 345 350

Ile Val Ala Pro Ser Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu
 355 360 365

Ser Val Ala Glu Asn Val Ala Thr Asn Leu Ser Asp Asn Leu Leu Ser
 370 375 380

Asn Leu Leu Gly Gly Ile Glu Thr Glu Glu Ile Lys Asp Ser Ile Leu
 385 390 395 400

Asn Glu Ile Glu Glu Val Lys Glu Asn Val Val Thr Thr Ile Leu Glu
 405 410 415

Lys Val Glu Glu Thr Thr Ala Glu Ser Val Thr Thr Phe Ser Asn Ile
 420 425 430

Leu Glu Glu Ile Gln Glu Asn Thr Ile Thr Asn Asp Thr Ile Glu Glu
 435 440 445

Lys Leu Glu Glu Leu His Glu Asn Val Leu Ser Ala Ala Leu Glu Asn
 450 455 460

Thr Gln Ser Glu Glu Glu Lys Lys Glu Val Ile Asp Val Ile Glu Glu
 465 470 475 480

Val Lys Glu Glu Val Ala Thr Thr Leu Ile Glu Thr Val Glu Gln Ala
 485 490 495

Glu Glu Glu Ser Glu Ser Thr Ile Thr Glu Ile Phe Glu Asn Leu Glu
500 505 510

Glu Asn Ala Val Glu Ser Asn Glu Lys Val Ala Glu Asn Leu Glu Lys
515 520 525

Leu Asn Glu Thr Val Phe Asn Thr Val Leu Asp Lys Val Glu Glu Thr
530 535 540

Val Glu Ile Ser Gly Glu Ser Leu Glu Asn Asn Glu Met Asp Lys Ala
545 550 555 560

Phe Phe Ser Glu Ile Phe Asp Asn Val Lys Gly Ile Gln Glu Asn Leu
565 570 575

Leu Thr Gly Met Phe Arg Ser Ile Glu Thr Ser Ile Val Ile Gln Ser
580 585 590

Glu Glu Lys Val Asp Leu Asn Glu Asn Val Val Ser Ser Ile Leu Asp
595 600 605

Asn Ile Glu Asn Met Lys Glu Gly Leu Leu Asn Lys Leu Glu Asn Ile
610 615 620

Ser Ser Thr Glu Gly Glu
625 630

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<211> 28

<212> DNA

<213> Artificial Sequence

<220>

<223> Synthetic DNA

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28

<210> 7

<211> 29

<212> DNA
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 <400> 7
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29

<210> 8
 <211> 25
 <212> DNA
 <213> Artificial Sequence

 <220>
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 <400> 8
 ggtatcgaaa ctgaggaaat aaagg

25

<210> 9
 <211> 24
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 <220>
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 <400> 9
 catagcagga acatcaacat ccac

24

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Arg Asp Glu Leu Phe Asn Glu Leu Leu Asn Ser Val Asp Val Asn Gly
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Glu Val Lys Glu Asn Ile Leu Glu Glu Ser Gln Val Asn Asp Asp Ile
 20 25 30

Phe Asn Ser Leu Val Lys Ser Val Gln Gln Glu Gln Gln His Asn Val
 35 40 45

Glu Glu
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<210> 11
 <211> 100
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 <223> Synthetic Peptide

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Val Glu Glu Ser Val Glu Glu Asn Asp Glu Glu Ser Val Glu Glu Asn
 1 5 10 15

Val Glu Glu Asn Val Glu Asn Asn Asp Asp Gly Ser Val Ala Ser Ser
 20 25 30

Val Glu Glu Ser Ile Ala Ser Ser Val Asp Glu Ser Ile Asp Ser Ser
 35 40 45

Ile Glu Glu Asn Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr
 50 55 60

Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Lys Cys Ala Pro Ser
 65 70 75 80

Val Glu Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Met
 85 90 95

Leu Lys Glu Arg
 100

<210> 12
 <211> 47
 <212> PRT
 <213> Artificial Sequence

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<223> Synthetic Peptide

<400> 12

Arg Asp Glu Leu Phe Asn Glu Leu Leu Asn Ser Val Asp Val Asn Gly
1 5 10 15

Glu Val Lys Glu Asn Ile Leu Glu Glu Ser Gln Val Asn Asp Asp Ile
20 25 30

Phe Asn Ser Leu Val Lys Ser Val Gln Gln Glu Gln Gln His Asn
35 40 45

<210> 13

<211> 26

<212> PRT

<213> Artificial Sequence

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<400> 13

Asp Glu Leu Phe Asn Glu Leu Leu Asn Ser Val Asp Val Asn Gly Glu
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Val Lys Glu Asn Ile Leu Glu Glu Ser Gln
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<210> 14

<211> 27

<212> PRT

<213> Artificial Sequence

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<400> 14

Leu Glu Glu Ser Gln Val Asn Asp Asp Ile Phe Ser Asn Ser Leu Val
1 5 10 15

Lys Ser Val Gln Gln Glu Gln Gln His Asn Val

20

25

<210> 15
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
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<400> 15

Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser Val Ala Pro Ser Val
1 5 10 15

Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser Val
20 25

<210> 16
<211> 20
<212> PRT
<213> Artificial Sequence

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<400> 16

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1 5 10 15

Leu Asn Asn Ile
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<210> 17
<211> 4
<212> PRT
<213> Artificial Sequence

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<400> 17

Val Glu Glu Ser
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<210> 18
<211> 4
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<400> 18

Val Glu Glu Asn
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<210> 19
<211> 4
<212> PRT
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<400> 19

Val Glu Glu Ile
1

<210> 20
<211> 4
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<220>
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<400> 20

Val Ala Pro Ser
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<210> 21
<211> 56
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 21

Val Glu Glu Lys Val Glu Glu Ser Val Glu Glu Asn Asp Glu Glu Ser
1 5 10 15

Val Glu Glu Asn Val Glu Glu Asn Val Glu Glu Asn Asp Asp Gly Ser
20 25 30

Val Ala Ser Ser Val Glu Glu Ser Ile Ala Ser Ser Val Asp Glu Ser
35 40 45

Ile Asp Ser Ser Ile Glu Glu Asn
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<210> 22

<211> 540

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic Peptide

<400> 22

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1 5 10 15

Val Ala Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser
20 25 30

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
35 40 45

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile
50 55 60

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
65 70 75 80

Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser
85 90 95

Val Glu Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
100 105 110

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
115 120 125

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile
130 135 140

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
145 150 155 160

Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser
165 170 175

Val Glu Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
180 185 190

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
195 200 205

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
210 215 220

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile
225 230 235 240

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
245 250 255

Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser
260 265 270

Val Glu Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
275 280 285

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser

290

295

300

Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
305 310 315 320

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Ser
325 330 335

Val Ala Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser
340 345 350

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
355 360 365

Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
370 375 380

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Val Glu Ser
385 390 395 400

Val Ala Pro Ser Val Glu Glu Ser Val Glu Glu Asn Val Glu Glu Ser
405 410 415

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
420 425 430

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ile
435 440 445

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ile
450 455 460

Val Ala Pro Ser Val Val Glu Ser Val Ala Pro Ser Val Glu Glu Ser
465 470 475 480

Val Glu Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
485 490 495

Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
500 505 510

Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Ser Val Glu Glu Ser
515 520 525

Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Asn
530 535 540

<210> 23
<211> 39
<212> PRT
<213> Artificial Sequence

<220>
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<400> 23

Asp Glu Asp Ile Glu Glu Asp Val Glu Glu Asp Ile Glu Glu Asp Ile
1 5 10 15

Glu Glu Asp Lys Val Glu Asp Ile Asp Glu Asp Ile Asp Glu Asp Ile
20 25 30

Gly Glu Asp Lys Asp Glu Val
35

<210> 24
<211> 56
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

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Val Glu Glu Asn Val Glu Glu Asn Val Glu Glu Asn Asp Asp Gly Ser
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 35 40 45

Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Ser Val Glu Glu Ser
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Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
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Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
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Val Ala Glu Asn Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ser
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Val Ala Pro Thr Val Glu Glu Ile Val Ala Pro Thr Val Glu Glu Ser
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Val Ala Pro Thr Val Glu Glu Ile Val Val Pro Ser Val Glu Glu Ser
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Val Ala Pro Ser Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
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Val Ala Glu Asn Val Glu Glu Ser Val Ala Glu Asn Val Glu Glu Ser
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